

INFORMATION DISCLOSURE STATEMENT

Applicant: CHOO, et al

Appln. No.: NEW APPLICATION

Filing Date: November 23, 1999

Examiner: unknown

Group Art Unit: unknown

Date: November 23, 1999

Page

1

of

1

U.S. PATENT DOCUMENTS

Examiner's Initials*	Document Number	Date MM/YYYY	Name (Family Name of First Inventor)	Class	SubClass	Filing Date (if appropriate)
	AR					
	BR					
	CR					
	DR					
	ER					
	FR					
	GR					
	HR					
	IR					
	JR					
	KR					
	LR					
	MR					
	NR					

FOREIGN PATENT DOCUMENTS

		Document Number	Date MM/YYYY	Country	Inventor Name	Class	SubClass	English Abstract		Translation Readily Available	
								Enclosed	No	Enclose	No
<i>AK</i>	OR	96 06166	2/1996	PCT	CHOO			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	PR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	QR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	RR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	SR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	UR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	VR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	WR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	XR							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OTHER (Including in this order Author, Title, Periodical Name, Date, Pertinent Pages, etc.)

<i>AK</i>	YR	ISALAN et al: "Synergy between adjacent zinc fingers in sequence-specific DNA recognition" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol 94, May 27, 1997 pages 5617-5621, XP002075337				
	ZR					
	AAR					
	ABR					
	ACR					

Examiner

Alpe Robinson

Date Considered:

6/10/03

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP '609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

Please type a plus sign (+) inside this box

PTO/SB/08A (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complete if Known

Application Number	09/424,487
Filing Date	02/24/00
First Named Inventor	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
JR	1	6,013,453		Choo et al.	01-11-2000	class 435/6
	2	6,007,988		Choo et al.	12-28-1999	435/6
	3	6,001,885		Vega et al.	12-14-1999	514/725
	4	5,972,615		An et al.	10-26-1999	435/6
	5	5,939,538		Leavitt et al.	08-17-1999	536/23.1
	6	5,916,794		Chandrasegaran	06-29-1999	435/199
	7	5,871,907		Winter et al.	02-16-1999	435/6
	8	5,871,902		Weininger et al.	02-16-1999	435/5
	9	5,869,618		Lippman et al.	02-9-1999	530/387.1
	10	5,792,640		Chandrasegaran	08-11-1998	435/199
	11	5,789,538		Rebar et al.	08-04-1998	530/324
	12	5,702,914		Evans et al.	12-30-1997	435/29
	13	5,674,738		Abramson et al.	10-07-1997	435/252.3
	14	5,639,592		Evans et al.	06-17-1997	435/4
	15	5,597,693		Evans et al.	01-28-1997	435/6
	16	5,578,483		Evans et al.	11-26-1996	435/240.2
	17	5,498,530		Schatz et al.	03-12-1996	435/69.1
	18	5,487,994		Chandrasegaran	01-30-1996	435/199
	19	5,436,150		Chandrasegaran	07-25-1995	435/199
	20	5,403,484		Ladner et al.	04-04-1995	435/235.1
	21	5,376,530		De The et al.	12-27-1994	435/6
	22	5,356,802		Chandrasegaran	10-18-1994	435/199
	23	5,350,840		Call et al.	09-27-1994	536/23.1
	24	5,348,864		Barbacid	09-20-1994	435/69.1
	25	5,340,739		Stevens et al.	08-23-1994	435/240.1
	26	5,324,819		Oppermann et al.	06-28-1994	530/350
	27	5,324,818		Nabel et al.	06-28-1994	435/69.1
	28	5,324,638		Tao et al.	06-28-1994	435/69.1
	29	5,302,519		Blackwood et al.	04-12-1994	435/69.1
	30	5,243,041		Fernandez-Pol	09-07-1993	536/23.5
	31	5,223,409		Ladner et al.	06-29-1993	435/69.7
	32	5,199,346		Ladner et al.	03-30-1993	435/69.1

Examiner Signature

He Robinson

Date Considered

6/10/03

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08A (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	09/424,487
				Filing Date	02/24/00
				First Named Inventor	Choo
				Group Art Unit	1653
				Examiner Name	Robinson, H.
Sheet	2	of	2	Attorney Docket Number	019496-006230US

33	5,096,815	Ladner et al.	03-17-1992	435/69-1
34	5,096,814	Aivasidis et al.	03-17-1992	435/6
35	4,990,607	Katagiri et al.	02-05-1991	435/6

FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ²
		Office ³	Number ⁴	Kind Code ⁵ (if known)				
✓	36	PCT	WO 99/48909	A2		09-30-1999	11	
	37	PCT	WO 99/47656	A2		09-23-1999	11	
	38	PCT	WO 99/45132	A1		09-10-1999	11	
	39	PCT	WO 99/42474	A2		08-26-1999	11	
	40	PCT	WO 99/41371	A1		08-19-1999	11	
	41	PCT	WO 99/36553	A2		07-22-1999	11	
	42	PCT	WO 98/54311	A1		12-03-1998	11	
	43	PCT	WO 98/53060	A1		11-26-1998	11	
	44	PCT	WO 98/53059	A1		11-26-1998	11	
✓	45	PCT	WO 98/53058	A1		11-26-1998	11	
	46	PCT	WO 98/53057	A1		11-26-1998	11	
	47	PCT	WO 97/27213	A1		07-31-1997	11	
	48	PCT	WO 97/27212	A1		07-31-1997	11	
	49	PCT	WO 96/32475	A2		10-17-1996	11	
	50	PCT	WO 96/20951	A1		07-11-1996	11	
	51	PCT	WO 96/11267	A1		04-08-1996	11	
	52	PCT	WO 96/06110	A1		02-29-1996	11	
	53	PCT	WO 95/19431	A1		07-25-1995	11	
✓	54	EP	875 567	A2		11-04-1998	11	

Examiner Signature	<i>He Robinson</i>	Date Considered	6/10/03
--------------------	--------------------	-----------------	---------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 7

Complete If Known

Application Number	09/424,487
Filing Date	02/24/00
First Named Inventor	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
JAR	55	AGARWAL et al., "Stimulation of Transcript Elongation Requires both the Zinc Finger and RNA Polymerase II Binding Domains of Human TFIIS," <i>Biochemistry</i> , 30(31):7842-7851 (1991).	
	56	ANATO et al., "A thermodynamic study of unusually stable RNA and DNA hairpins," <i>Nuc. Acids. Res.</i> , 19(21):5901-5905 (1991).	
	57	BARBAS, C. F., "Recent advances in phage display," <i>Curr. Opin. Biotech.</i> , 4:526-530 (1993).	
	58	BARBAS et al., "Assembly of combinatorial antibody libraries on phage surfaces: The gene III site," <i>PNAS</i> , 88:7978-7982 (1991).	
	59	BARBAS et al., "Semisynthetic combinatorial antibody libraries: A chemical solution to the diversity problem," <i>PNAS</i> , 89:4457-4461 (1992).	
	60	BELLEFROID et al., "Clustered organization of homologous KRAB zinc-finger genes with enhanced expression in human T lymphoid cells," <i>EMBO J.</i> , 12(4):1363-1374 (1993).	
	61	BERG, J. M., "DNA Binding Specificity of Steroid Receptors," <i>Cell</i> , 57:1065-1068 (1989).	
	62	BERG, J. M., "Sp1 and the subfamily of zinc finger proteins with guanine-rich binding sites," <i>PNAS</i> , 89:11109-11110 (1992).	
	63	BERG et al., "The Galvanization of Biology: A Growing Appreciation for the Roles of Zinc," <i>Science</i> , 271:1081-1085 (1996).	
	64	BERG, J. M., "Letting your fingers do the walking," <i>Nature Biotechnology</i> , 15:323 (1997)	
	65	BERGQVIST et al., "Loss of DNA-binding and new transcriptional <i>trans</i> -activation function in polyomavirus large T-antigen with mutation of zinc finger motif," <i>Nuc. Acids Res.</i> , 18(9):2715-2720 (1990).	
	66	BLAESE et al., "Vectors in cancer therapy: how will they deliver?," <i>Cancer Gene Therapy</i> , 2(4):291-297 (1995).	
	67	CAPONIGRO et al., "Transdominant genetice analysis of a growth control pathway," <i>PNAS</i> , 95:7508-7513 (1998)	
	68	CELENZA et al., "A Yeast Gene That Is Essential for Release from Glucose Repression Encodes a Protein Kinase," <i>Science</i> , 233:1175-1180 (1986).	
	69	CHENG et al., "Identification of Potential Target Genes for Adr1p through Characterization of Essential Nucleotides in UAS1," <i>Mol. Cellular Biol.</i> , 14(6):3842-3852 (1994).	
	70	CHENG et al., "A Single Amino Acid substitution in Zinc Finger 2 of Adr1p Changes its Binding Specificity at two Positions in UAS1," <i>J. Mol. Biol.</i> , 251:1-8 (1995)	
	71	CHOO et al., "A role in DNA binding for the linker sequences of the first three zinc fingers of TFIIIA," <i>Nuc. Acids Res.</i> , 21(15):3341-3346 (1993).	
✓	72	CHOO et al., "Designing DNA-binding proteins on the surface of filamentous phage," <i>Curr. Opin. Biotech.</i> , 6:431-436 (1995).	

Examiner Signature	<i>Age Robinson</i>	Date Considered	6/10/03
--------------------	---------------------	-----------------	---------

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Substitute for form 1449B/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 2 of 7

Complete if Known

Application Number	09/424,487
Filing Date	02/24/00
First Named Inventor	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

73	CHOO et al., "Promoter-specific Activation of Gene Expression Directed by Bacteriophage-selected Zinc Fingers," <i>J. Mol. Biol.</i> , 273:525-532 (1997).
74	CHOO, Y., "Recognition of DNA methylation by zinc fingers," <i>Nature Struct. Biol.</i> , 5(4):264-265 (1998).
75	CHOO et al., "All wrapped up," <i>Nature Structural Biology</i> , 5(4):253-255 (1998).
76	CHOO, Y., "End effects in DNA recognition by zinc finger arrays," <i>Nuc. Acids Res.</i> , 26(2):554-557 (1998).
77	CHOO et al., "In vivo repression by a site-specific DNA-binding protein designed against an oncogenic sequence," <i>Nature</i> , 372:642-645 (1994).
78	CORBI, N. et al., "Synthesis of a New Zinc Finger Peptide; Comparison of its 'Code' Deduced and 'CASTing' Derived Binding Sites," <i>FEBS Letters</i> , 417: 71-74 (1997).
79	CROZATIER et al., "Single Amino Acid Exchanges in Separate Domains of the Drosophila serendipity δ Zinc Finger Protein Cause Embryonic and Sex Biased Lethality," <i>Genetics</i> , 131:905-916 (1992).
80	DEBS et al., "Regulation of Gene Expression <i>in Vivo</i> by Liposome-mediated Delivery of a Purified Transcription Factor*," <i>J. Biological Chemistry</i> , 265(18):10189-10192 (1990).
81	DESJARLAIS et al., "Length-encoded multiplex binding site determination: Application to zinc finger proteins," <i>PNAS</i> , 91:11099-11103 (1994).
82	DESJARLAIS et al., "Use of a zinc-finger consensus sequence framework and specificity rules to design specific DNA binding proteins," <i>PNAS</i> , 90:2256-2260 (1993)
83	DESJARLAIS et al., "Toward rules relating zinc finger protein sequences and DNA binding site preferences," <i>PNAS</i> , 89(16):7345-7349 (1992)
84	DESJARLAIS et al., "Redesigning the DNA-Binding Specificity of a Zinc Finger Protein: A Data Base-Guided Approach," <i>Proteins: Structure, Function, and Genetics</i> , 12(2):101-104 (1992)
85	DESJARLAIS et al., "Redesigning the DNA-Binding Specificity of a Zinc Finger Protein: A Data Base-Guided Approach," <i>Proteins: Structure, Function, and Genetics</i> , 13:272 (1992)
86	DIBELLO et al., "The Drosophila Broad-Complex Encodes a Family of Related Proteins Containing Zinc Fingers," <i>Genetics</i> , 129:385-397 (1991).
87	ELROD-ERICKSON et al., "High-resolution structures of variant Zif268-DNA complexes: implications for understanding zinc finger-DNA recognition," <i>Structure</i> , 6(4):451-464 (1998).
88	FAIRALL et al., "The crystal structure of a two zinc-finger peptide reveals an extension to the rules for zinc-finger/DNA recognition," <i>Nature</i> , 366:483-487 (1993)
89	FRANKEL et al., "Fingering Too Many Proteins," <i>Cell</i> , 53:675 (1988).
90	FRIESEN et al., "Phage Display of RNA Binding Zinc Fingers from Transcription Factor IIIA*," <i>J. Biological Chem.</i> , 272(17):10994-10997 (1997).
91	GHOSH, D., "A relational database of transcription factors," <i>Nuc. Acids Res.</i> , 18(7):1749-1756 (1990).
92	GOGOS et al., "Recognition of diverse sequences by class I zinc fingers: Asymmetries and indirect effects on specificity in the interaction between CF2II and A+T-rich sequence elements," <i>PNAS</i> , 93(5):2159-2164 (1996)
93	GOSEN et al., "Tight control of gene expression in mammalian cells by tetracycline-responsive promoters," <i>PNAS</i> , 89:5547-5551 (1992)

Examiner Signature	<i>H. Robinson</i>	Date Considered	6/10/03
--------------------	--------------------	-----------------	---------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box 

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet

3

of

7

Complete if Known

Applicati n Number	09/424,480
Filing Dat	02/24/00
First Named Inv nt r	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

94	GREISMAN et al., "A General Strategy for Selecting High-Affinity Zinc Finger Proteins for Diverse DNA Target Sites," <i>Science</i> , 275:657-561 (1997)
95	HAMILTON et al., "High affinity binding sites for the Wilms' tumor suppressor protein WT1," <i>Nuc. Acids Res.</i> , 23(2):277-284 (1995).
96	HAMILTON et al., "Comparison of the DNA Binding Characteristics of the Related Zinc Finger Proteins WT1 and EGR1," <i>Biochemistry</i> , 37:2051-2058 (1998).
97	HANAS et al., "Internal deletion mutants of <i>Xenopus</i> transcription factor IIIA," <i>Nuc. Acids Res.</i> , 17(23):9861-9870 (1989).
98	HAYES et al., "Locations of Contacts between Individual Zinc Fingers of <i>Xenopus laevis</i> Transcription Factor IIIA and the Internal Control Region of a 5S RNA Gene," <i>Biochemistry</i> , 31:11600-11605 (1992).
99	HEINZEL et al., "A complex containing N-CoR, mSin3 and histone deacetylase mediates transcriptional repression," <i>Nature</i> , 387:43-48 (1997).
100	HIRST et al., "Discrimination of DNA response elements for thyroid hormone and estrogen is dependant on dimerization of receptor DNA binding domains," <i>PNAS</i> , 89:5527-5531 (1992).
101	HOFFMAN et al., "Structures of DNA-binding mutant zinc finger domains: Implications for DNA binding," <i>Protein Science</i> , 2:951-965 (1993).
102	ISALAN et al., "Comprehensive DNA Recognition through Concerted Interactions from Adjacent Zinc Fingers," <i>Biochemistry</i> , 37:12026-12033 (1998).
103	JACOBS, G. H., "Determination of the base recognition positions of zinc fingers from sequence analysis," <i>EMBO J.</i> , 11(12):4507-4517 (1992).
104	JAMIESON et al., "A zinc finger directory for high-affinity DNA recognition," <i>PNAS</i> , 93:12834-12839 (1996)
105	JAMIESON et al., "In Vitro Selection of Zinc Fingers with Altered DNA-Binding Specificity," <i>Biochemistry</i> , 33(19):5689-5695 (1994)
106	JULIAN et al., "Replacement of His23 by Cys in a zinc finger of HIV-1 NCp7 led to a change in 1H NMR-derived 3D structure and to a loss of biological activity," <i>FEBS letters</i> , 331(1,2):43-48 (1993).
107	KAMIUCHI et al., "New multi zinc finger protein: biosynthetic design and characteristics of DNA recognition," <i>Nucleic Acids Symposium Series</i> , 37:153-154 (1997).
108	KIM et al., "Serine at Position 2 in the DNA Recognition helix of a Cys2-His2 Zinc finger Peptide is Not, in General, Responsible for Base Recognition," <i>J. Mol. Biol.</i> , 252:1-5 (1995).
109	KIM et al., "Site-specific cleavage of DNA-RNA hybrids by zinc finger/ <i>FokI</i> cleavage domain fusions," <i>Gene</i> , 203:43-49 (1997).
110	KIM et al., "A 2.2 Å resolution crystal structure of a designed zinc finger protein bound to DNA," <i>Nat. Struct. Biol.</i> , 3(11):940-945 (1996)
111	KIM et al., "Getting a handhold on DNA: Design of poly-zinc finger proteins with femtomolar dissociation constants," <i>PNAS</i> , 95:2812-2817 (1998).
112	KIM et al., "Design of TATA box-binding protein/zinc finger fusions for targeted regulation of gene expression," <i>PNAS</i> , 94:3616-3620 (1997)
113	KIM et al., "Hybrid restriction enzymes: Zinc finger fusions to <i>Fok I</i> cleavage domain," <i>PNAS</i> , 93:1156-1160 (1996)

Examiner
Signature



Date
Considered

6/10/03

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

Applicati n Number	09/424,487
Filing Dat	02/24/00
First Named Inventor	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

Sheet 4 of 7

114	KIM et al., "Transcriptional repression by zinc finger peptides," <u>J. Biol. Chem.</u> , 272(47):29795-28000 (1997).
115	KINZLER et al., "The GLI gene is a member of the Kruppel family of zinc finger proteins," <u>Nature</u> , 332:371-4 (1988).
116	KLUG, A., "Gene Regulatory Proteins and Their Interaction with DNA," <u>Ann. NY Acad. Sci.</u> , 758:143-160 (1995).
117	KLUG et al., "Protein Motifs 5: Zinc Fingers," <u>FASEB J.</u> , 9:597-604 (1995).
118	KOTHEKAR, V., "Computer simulation of zinc finger motifs from cellular nucleic acid binding protein and their interaction with consensus DNA sequences," <u>FEBS Letters</u> , 274(1-2):217-222 (1990).
119	KRIWACKI et al., "Sequence-specific recognition of DNA by zinc-finger peptides derived from the transcription factor Sp1," <u>PNAS</u> , 89:9759-9763 (1992).
120	KULDA et al., "The regulatory gene <i>areA</i> mediating nitrogen metabolite repression in <i>Aspergillus nidulans</i> . Mutations affecting specificity of gene activation alter a loop residue of a putative zinc finger," <u>EMBO J.</u> , 9(5):1355-1364 (1990).
121	LIU et al., "Design of polydactyl zinc-finger proteins for unique addressing within complex genomes," <u>PNAS</u> , 94(11):5525-5530 (1997).
122	MANDEL-GUTFREUND et al., "Quantitative parameters for amino acid-base interaction: implications for prediction of protein-DNA binding sites," <u>Nuc. Acids Res.</u> , 26(10):2306-2312 (1998).
123	MARGOLIN et al., "Kruppel-associated boxes are potent transcriptional repression domains," <u>PNAS</u> , 91:4509-4513 (1994).
124	MIZUSHIMA et al., "pEF-BOS, a powerful mammalian expression vector," <u>Nuc. Acids Res.</u> , 18(17):5322 (1990).
125	NAKAGAMA et al., "Sequence and Structural Requirements for High-Affinity DNA Binding by the WT1 Gene Product," <u>Molecular and Cellular Biology</u> , 15(3):1489-1498 (1995).
126	NARDELLI et al., "Zinc finger-DNA recognition: analysis of base specificity by site-directed mutagenesis," <u>Nuc. Acids Res.</u> , 20(16):4137-4144 (1992).
127	NARDELLI et al., "Base sequence discrimination by zinc-finger DNA-binding domains," <u>Nature</u> , 349:175-178 (1991).
128	NEKLUDOVA et al., "Distinctive DNA conformation with enlarged major groove is found in Zn-finger-DNA and other protein-DNA complexes," <u>PNAS</u> , 91:6948-6952 (1994).
129	ORKIN et al., "Report and Recommendations of the Panel to Assess the NIH Investment in Research on Gene Therapy," December 7, 1995.
130	PABO et al., "Systematic Analysis of Possible Hydrogen Bonds between Amino Acid Side Chains and B-form DNA," <u>J. Biomolecular Struct. Dynamics</u> , 1:1039-1049 (1983).
131	PABO et al., "Protein-DNA Recognition," <u>Ann. Rev. Biochem.</u> , 53:293-321 (1984).
132	PABO, C. O., "Transcription Factors: Structural Families and Principals of DNA Recognition," <u>Ann. Rev. Biochem.</u> , 61:1053-1095 (1992).
133	PAVLETICH et al., "Crystal Structure of a Five-Finger GLI-DNA Complex: New Perspectives on Zinc Fingers," <u>Science</u> , 261:1701-1707 (1993).

Examiner Signature	<i>Hee Robinson</i>	Date Considered	6/10/03
--------------------	---------------------	-----------------	---------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 5 of 7

Complete if Known

Application Number	09/424,487
Filing Date	02/24/00
First Named Inventor	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

134	PAVLETICH et al., "Zinc Finger-DNA Recognition: Crystal Structure of a Zif268-DNA Complex at 2.1 Å," <i>Science</i> , 252:809-817 (1991)
135	PENGUE et al., "Repression of transcriptional activity at a distance by the evolutionarily conserved KRAB domain present in a subfamily of zinc finger proteins," <i>Nuc. Acids Res.</i> , 22(15):2908-2914 (1994).
136	PENGUE et al., "Transcriptional Silencing of Human Immunodeficiency Virus Type 1 Long Terminal Repeat-Driven Gene Expression by the Kruppel-Associated Box Repressor Domain Targeted to the Transactivating Response Element," <i>J. Virology</i> , 69(10):6577-6580 (1995).
137	PENGUE et al., "Kruppel-associated box-mediated repression of RNA polymerase II promoters is influenced by the arrangement of basal promoter elements," <i>PNAS</i> , 93:1015-1020 (1996).
138	POMMERANTZ et al., "Structure-Based Design of a Dimeric Zinc Finger Protein," <i>Biochemistry</i> , 37(4):965-970 (1998)
139	POMMERANTZ et al., "Structure-Based Design of Transcription Factors," <i>Science</i> , 267:93-96 (1995).
140	POMMERANTZ et al., "Analysis of homeodomain function by structure-based design of a transcription factor," <i>PNAS</i> , 92:9752-9756 (1995)
141	QIAN et al., "Two-Dimensional NMR Studies of the Zinc Finger Motif: Solution Structures and Dynamics of Mutant ZFY Domains Containing Aromatic Substitutions in the Hydrophobic Core," <i>Biochemistry</i> , 31:7463-7476 (1992).
142	QUIGLEY et al., "Complete Androgen Insensitivity Due to Deletion of Exon C of the Androgen Receptor Gene Highlights the Functional Importance of the Second Zinc Finger of the Androgen Receptor <i>in Vivo</i> ," <i>Molecular Endocrinology</i> , 6(7):1103-1112 (1992).
143	RAUSCHER et al., "Binding of the Wilms' Tumor Locus Zinc Finger Protein to the EGR-1 Consensus Sequence," <i>Science</i> , 250:1259-1262 (1990).
144	RAY et al., "Repressor to activator switch by mutations in the first Zn finger of the glucocorticoid receptor: Is direct DNA binding necessary?," <i>PNAS</i> , 88:7086-7090 (1991).
145	REBAR et al., "Phage Display Methods for Selecting Zinc Finger Proteins with Novel DNA-Binding Specificities," <i>Methods in Enzymology</i> , 267:129-149 (1996).
146	REBAR et al., "Zinc Finger Phage: Affinity Selection of Fingers with New DNA-Binding Specificities," <i>Science</i> , 263:671-673 (1994)
147	REITH et al., "Cloning of the major histocompatibility complex class II promoter binding protein affected in a hereditary defect in class II gene regulation," <i>PNAS</i> , 86:4200-4204 (1989).
148	RHODES et al., "Zinc Fingers: They play a key part in regulating the activity of genes in many species, from yeast to humans. Fewer than 10 years ago no one knew they existed," <i>Scientific American</i> , 268:56-65 (1993)
149	RICE et al., "Inhibitors of HIV Nucleocapsid Protein Zinc Fingers as Candidates for the Treatment of AIDS," <i>Science</i> , 270:1194-1197 (1995).
150	RIVERA et al., "A humanized system for pharmacologic control of gene expression," <i>Nature Medicine</i> , 2(9):1028-1032 (1996)
151	ROLLINS et al., "Role of TFIIIA Zinc Fingers <i>In vivo</i> : Analysis of Single-Finger Function in Developing <i>Xenopus</i> Embryos," <i>Molecular Cellular Biology</i> , 13(8):4776-4783 (1993).
152	SALEH et al., "A Novel Zinc Finger Gene on Human Chromosome 1qter That Is Alternatively Spliced in Human Tissues and Cell Lines," <i>Am. J. Hum. Genet.</i> , 52:192-203 (1993).

Examiner Signature	<i>Hope Robinson</i>	Date Considered	6/10/03
--------------------	----------------------	-----------------	---------

¹ EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 6

of 7

Complete If Known

Applicati n Number	09/424,467
Filing Date	02/24/00
First Named Invent r	Choo
Group Art Unit	1653
Examiner Name	Robinson, H.
Attorney Docket Number	019496-006230US

153	SHI et al., "Specific DNA-RNA Hybrid Binding by Zinc Finger Proteins," <i>Science</i> , 268:282-284 (1995).
154	SHI et al., "DNA Unwinding Induced by Zinc Finger Protein Binding," <i>Biochemistry</i> , 35:3845-3848 (1996)
155	SHI et al., "A direct comparison of the properties of natural and designed finger proteins," <i>Chem. & Biol.</i> , 2(2):83-89 (1995)
156	SINGH et al., "Molecular Cloning of an Enhancer Binding Protein: Isolation by Screening of an Expression Library with a Recognition Site DNA," <i>Cell</i> , 52:415-423 (1988).
157	SKERKA et al., "Coordinate Expression and Distinct DNA-Binding Characteristics of the four EGR-Zinc Finger Proteins in Jukat T Lymphocytes," <i>Immunobiology</i> , 198:179-191 (1997).
158	SOUTH et al., "The Nucleocapsid Protein Isolated from HIV-1 Particles Binds Zinc and Forms Retroviral-Type Zinc Fingers," <i>Biochemistry</i> , 29:7786-7789 (1990).
159	SUZUKI et al., "Stereochemical basis of DNA recognition by Zn fingers," <i>Nuc. Acids Res.</i> , 22(16):3397-3405 (1994)
160	SUZUKI et al. "DNA recognition code of transcription factors in the helix-turn-helix, probe helix, hormone receptor, and zinc finger families," <i>PNAS</i> , 91:12357-12361 (1994)
161	SWIRNOFF et al., "DNA-Binding Specificity of NGFI-A and Related Zinc Finger Transcription Factors," <i>Mol. Cell. Biol.</i> , 15(4):2275-2287 (1995)
162	TAYLOR et al., "Designing Zinc-Finer ADR1 Mutants with Altered Specificity of DNA Binding to T in UAS1 Sequences," <i>Biochemistry</i> , 34:3222-3230 (1995)
163	THIESEN et al., "Determination of DNA binding specificities of mutated zinc finger domains," <i>FEBS Letters</i> , 283(1):23-26 (1991).
164	THIESEN et al., "Amino Acid Substitutions in the SP1 Zinc Finger Domain Alter the DNA Binding Affinity to Cognate SP1 Target Site," <i>Biochem. Biophys. Res. Communications</i> , 175(1):333-338 (1991).
165	THUKRAL et al., "Localization of a Minimal Binding Domain and Activation Regions in Yeast Regulatory Protein ADR1," <i>Molecular Cellular Biology</i> , 9(6):2360-2369 (1989).
166	THUKRAL et al., "Two Monomers of Yeast Transcription Factor ADR1 Bind a Palindromic Sequence Symmetrically to Activate <i>ADH2</i> Expression," <i>Molecular Cellular Biol.</i> , 11(3):1566-1577 (1991).
167	THUKRAL et al., "Alanine scanning site-directed mutagenesis of the zinc fingers of transcription factor ADR1: Residues that contact DNA and that transactivate," <i>PNAS</i> , 88:9188-9192 (1991), + correction page.
168	THUKRAL et al., "Mutations in the Zinc Fingers of ADR1 That Change the Specificity of DNA Binding and Transactivation," <i>Mol. Cell Biol.</i> , 12(6):2784-2792 (1992)
169	VORTKAMP et al., "Identification of Optimized Target Sequences for the GLI3 Zinc Finger Protein," <i>DNA Cell Biol.</i> , 14(7):629-634 (1995).
170	WEBSTER et al., "Conversion of the E1A Cys4 zinc finger to a nonfunctional His2, Cys2 zinc finger by a single point mutation," <i>PNAS</i> , 88:9989-9993 (1991).
171	WHYATT et al., "The two zinc finger-like domains of GATA-1 have different DNA binding specificities," <i>EMBO J.</i> , 12(13):4993-5005 (1993).
172	WILSON et al., "In Vivo Mutational analysis of the NGFI-A Zinc Fingers*," <i>J. Biol. Chem.</i> , 267(6):3718-3724 (92).

Examiner
Signature

Hope Robinson

Date
Considered

6/10/03

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1

Please type a plus sign (+) inside this box

PTO/SB/08B (08-00)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Complete if Known			
		Application Number	09/424,488		
		Filing Date	02/24/00		
		First Named Inventor	Choo		
		Group Art Unit	1653		
		Examiner Name	Robinson, H.		
Sheet	7	of	7	Attorney Docket Number	019496-006230US

✓	173	WITZGALL et al., "The Kruppel-associated box-A (KRAB-A) domain of zinc finger proteins mediates transcriptional repression," <i>PNAS</i> , 91:4514-4518 (1994).	
	174	WRIGHT et al., "Expression of a Zinc Finger Gene in HTLV-I- and HTLV-II-transformed Cells," <i>Science</i> , 248:588-591 (1990).	
	175	WU et al., "Building zinc fingers by selection: Toward a therapeutic application," <i>PNAS</i> , 92:344-348 (1995).	
	176	YANG et al., "Surface plasmon resonance based kinetic studies of zinc finger-DNA interactions," <i>J. Immunol. Methods</i> , 183:175-182 (1995).	
✓	177	YU et al., "A hairpin ribozyme inhibits expression of diverse strains of human immunodeficiency virus type 1," <i>PNAS</i> , 90:6340-6344 (1993).	

Examiner Signature	<i>Hope Robinson</i>	Date Considered	6/10/03
--------------------	----------------------	-----------------	---------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

PA 3188377 v1